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part of a series of photographic portraits of the Presidents of the Society, made and presented by Mr. W. Schooling; C. Flammarion, La planète Mars, presented by the author; Barlow and Bryan, Elementary Mathematical Astronomy, presented by Mr. W. T. Lynn; A. Guillemin, Autres Mondes, presented by the author; Catalogue of Proper-motion Stars, by J. G. Porter, presented by the Cincinnati Observatory; Oxford University Observatory, Researches in Stellar Parallax by the aid of Photography, Part 2, presented by the Observatory; H. Gyldén, Nouvelles recherches sur les séries employées dans les théories des Planètes, presented by the author; E. L. Trouvelot, Drawing of a portion of the Milky Way, presented by M. Trouvelot (per Mr. A. Marth); Lick Observatory, Photographs of the Moon and *Jupiter* (enlarged positives on glass), presented by the Observatory; Sydney Observatory, Photographs of portions of the Moon and of the region surrounding η *Argûs* (enlargements on paper), presented by Mr. H. C. Russell; Astronomische Gesellschaft, Catalog, Zone + 50° bis 55° (Cambridge, Mass.), presented by the Society; Specola Vaticana, Pubblicazioni I. and II., presented by the Observatory; von Kuffner'sche Sternwarte, Publicationen, Band II., presented by the Observatory; J. Bossert, Catalogue de 3950 étoiles (supplément à l'Histoire Céleste de Lalande), presented by the author.

On the Variation of Latitude, as indicated by Recent Observations at the Royal Observatory, Greenwich. By W. G. Thackeray and H. H. Turner, M.A., B.Sc.

The publication of a Star Catalogue at Greenwich has generally been an occasion for discussing the systematic errors of that and of previous catalogues, from comparisons *inter se*, or with catalogues of other observatories. The last Greenwich Catalogue (Ten-Year, 1880) is, for instance, readily comparable with Stone's Cape Catalogue, 1880, and the comparison has an important bearing on the determination of refraction. It has, indeed, already been made, but the discussion is not quite complete, though it is hoped soon to publish the results. But a somewhat new departure has been made in connection with the Ten-Year Catalogue, in the comparison of the N.P.D.s for different years with the mean. The investigation was, from the nature of the case, limited to those stars which had been well observed at different epochs throughout the ten years; and in practice only those stars were included which had been observed in at least five years out of the ten. For such stars the annual means for N.P.D., formed in the computation sheets during the process of reduction to 1880·0, were compared with the finally adopted result for N.P.D., and the excesses tabulated under the respective years, with a view to the detection of systematic error. Subsidiary arrangements of these quantities were made both in R.A. and N.P.D., and the results are shown in the following tables.

TABLE I.

Excess of Annual Mean N.P.D. over Adopted Result for N.P.D., arranged according to Right Ascension.

(The suffixes indicate the number of observations.)

R.A. h h	1877.	1878.	1879	1880.	1881.	1882.	1883.	1884.	1885.	1886.
0 – 6	$+0\cdot03_{393}$	$+0\cdot09_{393}$	$+0\cdot07_{381}$	$+0\cdot01_{471}$	$-0\cdot06_{471}$	$-0\cdot04_{430}$	$+0\cdot06_{414}$	$-0\cdot26_{426}$	$+0\cdot04_{380}$	$-0\cdot01_{493}$
6 – 12	$-0\cdot02_{241}$	$-0\cdot02_{317}$	$+0\cdot09_{267}$	$-0\cdot04_{345}$	$+0\cdot06_{328}$	$+0\cdot09_{422}$	$+0\cdot04_{381}$	$+0\cdot01_{314}$	$-0\cdot08_{315}$	$+0\cdot01_{371}$
12 – 18	$+0\cdot10_{268}$	$+0\cdot04_{316}$	$-0\cdot09_{325}$	$-0\cdot13_{340}$	$+0\cdot06_{278}$	$+0\cdot05_{329}$	$+0\cdot17_{300}$	$+0\cdot02_{305}$	$-0\cdot13_{344}$	$-0\cdot06_{322}$
18 – 24	$+0\cdot11_{472}$	$+0\cdot12_{523}$	$+0\cdot01_{517}$	$-0\cdot16_{514}$	$-0\cdot11_{580}$	$-0\cdot03_{412}$	$+0\cdot02_{550}$	$+0\cdot09_{544}$	$-0\cdot09_{500}$	$-0\cdot05_{496}$
Mean	$+0\cdot06_{1373}$	$+0\cdot06_{1564}$	$+0\cdot02_{1490}$	$-0\cdot08_{1689}$	$-0\cdot03_{1647}$	$+0\cdot02_{1593}$	$+0\cdot06_{1643}$	$+0\cdot02_{1589}$	$-0\cdot06_{1568}$	$-0\cdot03_{1670}$

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TABLE II.

Excess of Annual Mean N.P.D. over Adopted Result for N.P.D., arranged according to N.P.D.

(The suffixes indicate the number of observations.)

N.P.D.		1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.
°	°	″	″	″	″	″	″	″	″	″	″
− 30 to	− 40	$-0{\cdot}59_{6}$	...	$+0{\cdot}36_{3}$	$-0{\cdot}27_{7}$	$+0{\cdot}21_{7}$	$-0{\cdot}17_{11}$	$+0{\cdot}02_{12}$	$+0{\cdot}39_{14}$	$-1{\cdot}04_{1}$	$-0{\cdot}25_{6}$
− 20	− 30	$-0{\cdot}47_{6}$	$-0{\cdot}12_{5}$	$-0{\cdot}27_{7}$	$-0{\cdot}14_{19}$	$+0{\cdot}12_{18}$	$-0{\cdot}26_{43}$	$+0{\cdot}11_{46}$	$-0{\cdot}14_{43}$	$-0{\cdot}03_{61}$	$+0{\cdot}20_{59}$
− 10	− 20	$-0{\cdot}08_{12}$	$+0{\cdot}29_{7}$	$+0{\cdot}11_{10}$	$-0{\cdot}04_{12}$	$-0{\cdot}01_{12}$	$-0{\cdot}07_{22}$	$-0{\cdot}09_{39}$	$-0{\cdot}01_{10}$	$-0{\cdot}02_{37}$	$-0{\cdot}14_{38}$
− 0	− 10	$-0{\cdot}06_{162}$	$-0{\cdot}13_{109}$	$-0{\cdot}35_{97}$	$-0{\cdot}23_{140}$	$-0{\cdot}02_{161}$	$+0{\cdot}03_{169}$	$+0{\cdot}24_{200}$	$+0{\cdot}31_{188}$	$-0{\cdot}14_{153}$	$+0{\cdot}12_{124}$
0	10	$+0{\cdot}07_{200}$	$+0{\cdot}08_{110}$	$+0{\cdot}09_{140}$	$-0{\cdot}11_{193}$	$-0{\cdot}09_{185}$	$-0{\cdot}05_{206}$	$+0{\cdot}19_{230}$	$+0{\cdot}12_{184}$	$-0{\cdot}22_{178}$	$-0{\cdot}11_{163}$
10	20	$+0{\cdot}18_{77}$	$0{\cdot}00_{92}$	$-0{\cdot}13_{80}$	$+0{\cdot}03_{94}$	$-0{\cdot}08_{76}$	$-0{\cdot}06_{43}$	$+0{\cdot}01_{47}$	$+0{\cdot}15_{57}$	$-0{\cdot}11_{57}$	$+0{\cdot}02_{62}$
20	30	$+0{\cdot}05_{139}$	$+0{\cdot}06_{140}$	$-0{\cdot}03_{155}$	$-0{\cdot}15_{190}$	$-0{\cdot}04_{200}$	$-0{\cdot}01_{140}$	$+0{\cdot}11_{93}$	$+0{\cdot}26_{92}$	$-0{\cdot}14_{75}$	$+0{\cdot}08_{106}$
30	40	$-0{\cdot}19_{18}$	$+0{\cdot}19_{23}$	$-0{\cdot}08_{19}$	$-0{\cdot}13_{30}$	$-0{\cdot}20_{21}$	$-0{\cdot}26_{21}$	$+0{\cdot}18_{26}$	$+0{\cdot}18_{23}$	$+0{\cdot}21_{17}$	$+0{\cdot}08_{25}$
40	50	$+0{\cdot}01_{50}$	$+0{\cdot}20_{34}$	$+0{\cdot}02_{22}$	$-0{\cdot}04_{38}$	$-0{\cdot}30_{41}$	$-0{\cdot}12_{43}$	$+0{\cdot}03_{42}$	$+0{\cdot}16_{59}$	$+0{\cdot}12_{70}$	$-0{\cdot}15_{65}$
50	60	$+0{\cdot}02_{127}$	$+0{\cdot}01_{133}$	$-0{\cdot}11_{141}$	$-0{\cdot}12_{138}$	$+0{\cdot}04_{111}$	$0{\cdot}00_{85}$	$+0{\cdot}14_{77}$	$-0{\cdot}05_{62}$	$+0{\cdot}02_{55}$	$+0{\cdot}13_{79}$
60	70	$+0{\cdot}02_{224}$	$+0{\cdot}10_{259}$	$+0{\cdot}06_{275}$	$-0{\cdot}08_{299}$	$+0{\cdot}03_{217}$	$-0{\cdot}03_{202}$	$-0{\cdot}06_{167}$	$+0{\cdot}03_{199}$	$-0{\cdot}03_{181}$	$-0{\cdot}02_{231}$
70	80	$+0{\cdot}03_{161}$	$+0{\cdot}10_{235}$	$-0{\cdot}10_{205}$	$-0{\cdot}10_{214}$	$+0{\cdot}01_{186}$	$+0{\cdot}06_{214}$	$+0{\cdot}09_{196}$	$+0{\cdot}05_{175}$	$-0{\cdot}03_{210}$	$-0{\cdot}03_{186}$
80	90	$+0{\cdot}31_{85}$	$+0{\cdot}09_{128}$	$-0{\cdot}02_{119}$	$-0{\cdot}16_{140}$	$-0{\cdot}09_{94}$	$+0{\cdot}17_{176}$	$+0{\cdot}03_{174}$	$-0{\cdot}04_{198}$	$-0{\cdot}17_{238}$	$+0{\cdot}04_{246}$
90	100	$+0{\cdot}07_{54}$	$-0{\cdot}20_{75}$	$+0{\cdot}08_{98}$	$-0{\cdot}17_{108}$	$-0{\cdot}10_{92}$	$+0{\cdot}09_{128}$	$+0{\cdot}15_{191}$	$+0{\cdot}08_{175}$	$-0{\cdot}10_{145}$	$-0{\cdot}13_{186}$
100	110	$+0{\cdot}07_{55}$	$-0{\cdot}07_{88}$	$+0{\cdot}02_{86}$	$-0{\cdot}24_{75}$	$-0{\cdot}01_{92}$	$+0{\cdot}01_{107}$	$+0{\cdot}34_{111}$	$-0{\cdot}09_{101}$	$-0{\cdot}22_{102}$	$+0{\cdot}01_{87}$
110	120	$-0{\cdot}30_{42}$	$+0{\cdot}05_{11}$	$-0{\cdot}10_{55}$	$+0{\cdot}04_{48}$	$+0{\cdot}54_{31}$	$+0{\cdot}01_{77}$	$+0{\cdot}26_{54}$	$-0{\cdot}02_{61}$	$-0{\cdot}13_{39}$	$-0{\cdot}35_{66}$
Mean	...	$+0{\cdot}06_{1418}$	$+0{\cdot}06_{1509}$	$+0{\cdot}01_{1514}$	$-0{\cdot}08_{1743}$	$-0{\cdot}02_{1574}$	$+0{\cdot}02_{1687}$	$+0{\cdot}07_{1706}$	$+0{\cdot}01_{1677}$	$-0{\cdot}07_{1619}$	$-0{\cdot}04_{172}$

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It is not proposed to make any further comment on these tables as they stand in the present paper, the object of which is to give the results of a line of investigation suggested by the inspection of Table I., which affords sufficient evidence in favour of Mr. Chandler's fourteen-monthly period in latitude to make the present note of immediate interest.

Mr. Thackeray's interpretation of Table I. was as follows:—The right ascension of a star is a rough indication of the time of year at which it was observed. We may assume the mean time of observation at Greenwich to be about midway between sunset and 2 A.M., or for our present purpose 10 o'clock P.M.; so that the mean time of observation of the groups 0^h–6^h, 6^h–12^h, 12^h–18^h, and 18^h–24^h would be as follows:—

Group.	Mean R A.	Mean Epoch of Observation.
h h	h	
0 – 6	3·0	Dec. 5
6 – 12	9·0	Mar. 7
12 – 18	15·0	June 6
18 – 24	21·0	Sept. 5

If, then, the groups in Table I. are arranged consecutively, placing each column in order under the one to the left, we shall have a rough indication of the systematic changes in N P.D. arranged in order of time. There is, of course, the considerable error in this assumption that observations in the group 0^h–6^h in any year were made partly at the beginning and partly at the end of the year, whereas we can only assign them to one of these epochs; but for the particular discussion in question the error thus introduced is not too serious, for Mr. Chandler's period of variation (fourteen months) does not differ very largely from a year, and consequently the phases at the beginning and end of the year would not be very different.

But it is to be remarked that the formation of such large groups as those of six hours—corresponding to nearly a quarter of the whole period—considerably diminishes the apparent amplitude of the wave under discussion. [The theoretical apparent amplitude would become about seven-tenths of the original.] Further, stars observed below the pole must be regarded as having an R.A. differing by twelve hours from their tabular R.A., and Table I. must be corrected accordingly. The original comparison with Mr. Chandler's inequality was, however, made without this correction.

Crediting the group 0^h–6^h, therefore, to the end of the year, we get the chronological variation of N.P.D., as in the following table in the column O, where in the column C is given the theoretical variation according to Mr. Chandler's paper in the *Astronomical Journal*, No. 267:—

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TABLE III.

Excess of Mean Annual Mean N.P.D. over Adopted Result for N.P.D., arranged for every 6^h *of Right Ascension and compared with the Theoretical Variation of Latitude computed from Chandler's Formula ("Astronomical Journal,"* No. 267).

Date.	O.	C.	Date.	O.	C.
1877 Mar. 7	$-0{\cdot}02_{215}$	$-\ {\cdot}01$	1882 Mar. 7	$+0{\cdot}08_{405}$	$+\ {\cdot}22$
June 6	$+0{\cdot}10_{354}$	$+\ {\cdot}21$	June 6	$+0{\cdot}01_{410}$	$+\ {\cdot}04$
Sept. 5	$-0{\cdot}13_{458}$	$+\ {\cdot}09$	Sept. 5	$0{\cdot}00_{429}$	$-\ {\cdot}19$
Dec. 5	$+0{\cdot}02_{303}$	$-\ {\cdot}17$	Dec. 5	$-0{\cdot}03_{349}$	$-\ {\cdot}14$
1878 Mar. 7	$+0{\cdot}01_{315}$	$-\ {\cdot}15$	1883 Mar. 7	$+0{\cdot}05_{357}$	$+\ {\cdot}11$
June 6	$+0{\cdot}04_{383}$	$+\ {\cdot}11$	June 6	$+0{\cdot}09_{375}$	$+\ {\cdot}20$
Sept 5	$+0{\cdot}10_{486}$	$+\ {\cdot}20$	Sept. 5	$+0{\cdot}01_{572}$	$0{\cdot}00$
Dec. 5	$+0{\cdot}08_{280}$	${\cdot}00$	Dec. 5	$+0{\cdot}13_{339}$	$-\ {\cdot}20$
1879 Mar. 7	$+0{\cdot}04_{265}$	$-\ {\cdot}22$	1884 Mar. 7	$+0{\cdot}01_{287}$	$-\ {\cdot}07$
June 6	$+0{\cdot}03_{385}$	$+\ {\cdot}09$	June 6	$-0{\cdot}10_{401}$	$+\ {\cdot}15$
Sept. 5	$+0{\cdot}01_{519}$	$+\ {\cdot}17$	Sept. 5	$+0{\cdot}07_{571}$	$+\ {\cdot}18$
Dec. 5	$+0.03_{314}$	$+\ {\cdot}15$	Dec. 5	$+0{\cdot}05_{332}$	$-\ {\cdot}06$
1880 Mar. 7	$-0{\cdot}05_{335}$	$+\ {\cdot}09$	1885 Mar. 7	$-0{\cdot}09_{344}$	$-\ {\cdot}22$
June 6	$-0{\cdot}08_{401}$	$-0{\cdot}22$	June 6	$-0{\cdot}03_{114}$	$-\ {\cdot}07$
Sept. 5	$-0{\cdot}14_{535}$	$0{\cdot}00$	Sept. 5	$-0{\cdot}08_{498}$	$+\ {\cdot}19$
Dec. 5	$-0{\cdot}04_{409}$	$+\ {\cdot}21$	Dec. 5	$-0{\cdot}06_{310}$	$+\ {\cdot}13$
1881 Mar. 7	$+0{\cdot}07_{328}$	$+\ {\cdot}11$	1886 Mar. 7	$+0{\cdot}03_{336}$	$-\ {\cdot}11$
June 6	$+0{\cdot}05_{359}$	$-\ {\cdot}15$	June 6	$-0{\cdot}05_{377}$	$-\ {\cdot}20$
Sept. 5	$-0{\cdot}13_{171}$	$-\ {\cdot}20$	Sept. 5	$-0{\cdot}06_{530}$	${\cdot}00$
Dec. 5	$-0{\cdot}06_{390}$	$+\ {\cdot}04$	Dec. 5	$-0{\cdot}03_{116}$	$+\ {\cdot}19$

This comparison is professedly only rough; but, as it is distinctly favourable to the existence of an inequality such as that of Mr. Chandler's (more especially noticeable when the results are represented in diagrammatic form), a more direct investigation was at once undertaken. A complete examination of all the stars would have involved much labour, and it was, therefore, determined to make some preliminary calculations before definitely embarking on this enterprise.

I. From the theoretical expressions given in Mr. Chandler's paper, above quoted, the epochs of maximum and minimum latitude were calculated. Now, it has long been recognised that there are systematic errors of *annual* period affecting the Greenwich N.P.D.s, the origin of which is not yet completely understood, but which it is necessary to eliminate carefully for the purposes of the present discussion. This can be done by comparing observations of the same star made (say) in 1880

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December and 1883 December, when the phase of the annual inequality should be the same, but that of Mr. Chandler's inequality should be a maximum in one case and a minimum in the other. Accordingly search was made for observations of the same stars, in months of the same name, at two epochs when such observations should be in one case on the crest, in the other in the trough of Mr. Chandler's wave, and the mean differences formed, weights being assigned according to the formula $\frac{2mn}{m+n}$, where m and n are the numbers of observations at the two epochs. The results, with corresponding weights, are given in Table IV.

The material available must now be restricted to 1880 and following years, for there are systematic corrections to be applied to the individual results in 1877–1879, though these corrections were applied in the Ten-Year Catalogue.

Table IV.

Epochs of Maximum.	Epochs of Minimum.	Diff.	Weight.
1883 May 20	1880 May 23	−0′·62	51
1880 Dec. 26	1883 Dec. 19	−0·05	48
1884 July 27	1881 July 31	−0·69	39
1882 Mar. 3	1885 Mar. 4	−0·27	230
1885 Oct. 11	1882 Oct. 8	−0·18	87
1883 May 20	1886 May 19	−0·44	120
1886 Dec. 28	1883 Dec. 19	−0·60	38
1884 July 27	1887 Aug. 8	−0·82	76
1888 Mar. 10	1885 Mar. 4	+0·16	60
1885 Oct. 11	1888 Oct. 29	−0·46	89
1889 June 12	1886 May 19	−0·20	122
1886 Dec. 28	1890 Jan. 21	−0·40	79
	Mean ...	−0·35	

The sign − implies that the differences of the observed N.P.D.s are too large, or, according to Chandler, that at the period of maximum the mean colatitude is too large, and at the period of minimum the mean colatitude is too small.

II. So far the theoretical difference between the epochs of maximum and minimum is very fairly confirmed, though it is obvious that there are large accidental errors. As a further and independent test, the epochs were selected where the wave crosses the zero line; but there are of course ascending nodes and descending nodes, and comparisons were made between nodes of opposite senses, and not those of the same sense. The

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results, as will be seen from Table V., were not so favourable to the theory, which may be due to one of three causes—

(1) The large accidental errors, in which are to be included systematic errors of a different kind from the one here considered. It will be shown, for instance, in the sequel that there is evidence of a 5-yearly inequality.

(2) A slight error in the epoch of the inequality, owing to which the wave is displaced in the direction of its length. The results of Table IV. would in this case not be appreciably affected; but there would be the maximum disturbance of Table V. It would appear from the sequel that the error, if any, is small.

(3) A want of symmetry in the wave, owing to the rotation of the pole being elliptic and not circular. It is evident from the sequel that this is very doubtful, but combined with (1) might be the explanation of the persistence of sign in Table V.

TABLE V.

Epochs of			
Zero.	Zero.	Diff.	Weight.
1883 Sept. 5	1880 Sept. 9	−0″·74	106
1881 April 14	1884 April 8	−0·13	120
1884 Nov. 14	1881 Nov. 16	−0·16	74
1882 June 21	1885 June 24	−0·11	127
1886 Jan. 29	1883 Jan. 28	+0·24	101
1883 Sept. 5	1886 Sept. 8	−0·07	168
1887 April 19	1884 April 8	+0·06	99
1884 Nov. 14	1887 Nov. 25	−0·26	138
1888 July 5	1885 June 24	−0·15	85
1886 Jan. 29	1889 Feb. 19	+0·29	53
1889 Oct. 1	1886 Sept. 8	−0·22	114
	Mean ...	−0·14	

III. The most satisfactory material for such a discussion as the present is obviously the series of observations of the close circumpolars, and especially *Polaris*, which extend over many months, and are otherwise numerous, and were accordingly excluded from discussions I. and II., to be treated independently. A treatment of these precisely similar to that in discussions I. and II. need not be further considered here, as it is virtually included in the final discussion; wherein monthly means uncorrected for R − D were formed from the observations of these stars in the years 1880–1891, and compared with an adopted mean place for 1885·0, obtained by combining the places in the Ten-Year Catalogue 1880·0 and the Five-Year Catalogue 1890·0 (shortly to be published), and the differences plotted on paper as

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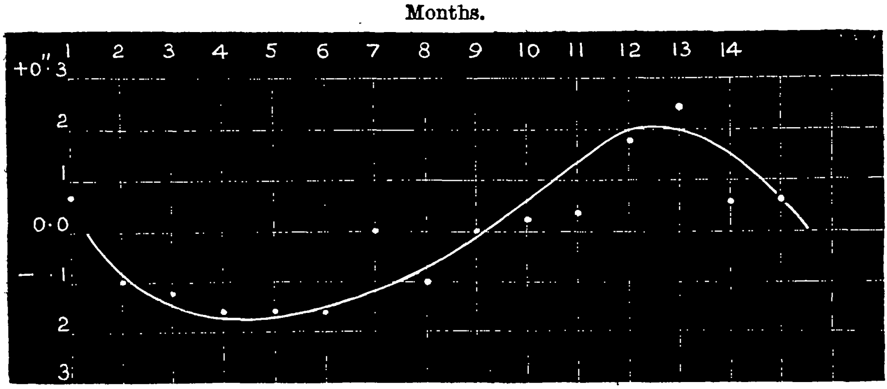
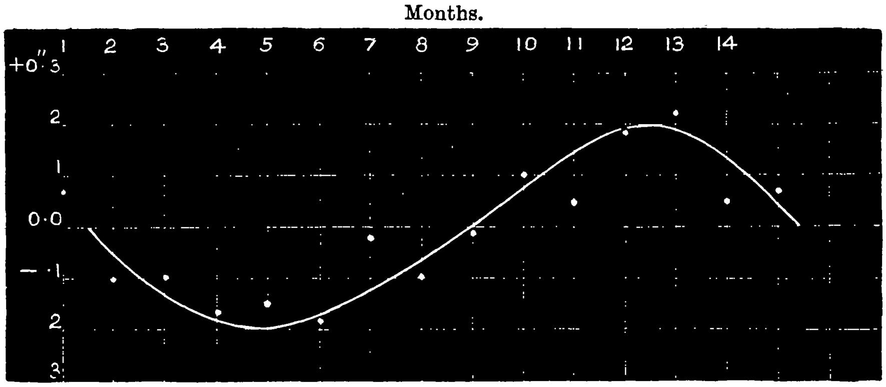
in Plate I., on which is also shown Mr. Chandler's theoretical curve. It will be seen that there is a fair agreement



1st Supposition.

almost throughout, although there are three marked divergences between the two which do not seem to be wholly explicable by



1st Supposition (corrected).

accidental error. These occur about 1881, 1886, and 1891, and the equality of the intervals separating them suggests a five-yearly disturbance, as mentioned above, though the evidence is, of course, very incomplete.

But when corresponding phases of the wave are taken together and the mean result formed for the whole of the nine periods, there seems to be indisputable evidence of the Chandler wave. There is a little doubt occasionally as to the assignment of particular months which fall between two of the fourteen or fifteen phases of the wave; but, adopting the two different suppositions of a fourteen- or fifteen-month period as roughly agreeing with the varying periods of rotation at the beginning of 1880 and end of 1890 respectively, the observations give the results shown in Table VI.

The results of columns 2 and 4 have been corrected for the general mean correction +0''·12.

The 3rd and 5th columns have been corrected as follows:—It has been assumed that the R−D correction varies annually

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about a constant mean value during the period under discussion, and that the mean for the four polars above and below pole is $-0''{\cdot}35$. The value of the correction for the different months has been computed from the coefficients given by Mr. Turner in his paper communicated to the Society in March last, and the following corrections for the differences between these values and the mean have been applied.

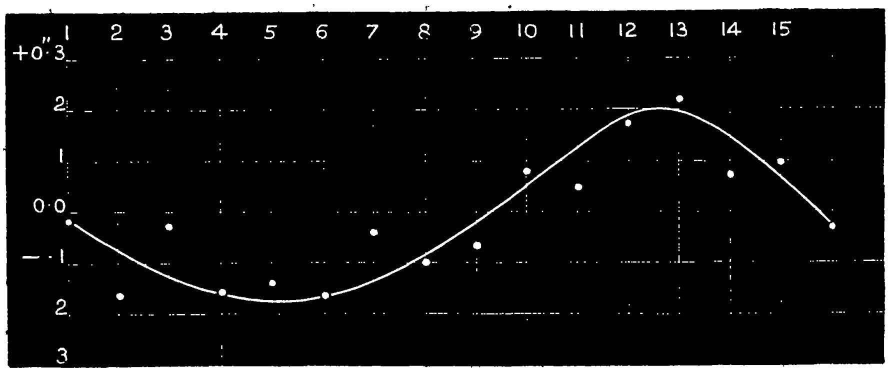
Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
$+''{\cdot}05$	$+''{\cdot}07$	$+''{\cdot}01$	$-''{\cdot}06$	$-''{\cdot}15$	$-''{\cdot}14$	$-''{\cdot}10$	$-''{\cdot}05$	$-''{\cdot}01$	$-''{\cdot}02$	$+''{\cdot}02$	$+''{\cdot}03$

The general mean correction of $+0''{\cdot}09$ has also been applied. The wave form given by the corrected results appears to be the more symmetrical.

TABLE VI.

Phase.	1st Supposition.	Corrected for R−D.	2nd Supposition.	Corrected for R−D.
	$''$	$''$	$''$	$''$
1st month	$+0{\cdot}07_{246}$	$+0{\cdot}09$	$-0{\cdot}01_{229}$	$0{\cdot}00$
2nd ,,	$-0{\cdot}10_{221}$	$-0{\cdot}10$	$-0{\cdot}17_{218}$	$-0{\cdot}16$
3rd ,,	$-0{\cdot}11_{254}$	$-0{\cdot}10$	$-0{\cdot}02_{174}$	$+0{\cdot}03$
4th ,,	$-0{\cdot}16_{253}$	$-0{\cdot}17$	$-0{\cdot}15_{215}$	$-0{\cdot}16$
5th ,,	$-0{\cdot}15_{225}$	$-0{\cdot}14$	$-0{\cdot}13_{229}$	$-0{\cdot}14$
6th ,,	$-0{\cdot}15_{232}$	$-0{\cdot}18$	$-0{\cdot}16_{224}$	$-0{\cdot}16$
7th ,,	$0{\cdot}00_{233}$	$-0{\cdot}02$	$-0{\cdot}04_{215}$	$-0{\cdot}03$
8th ,,	$-0{\cdot}10_{217}$	$-0{\cdot}10$	$-0{\cdot}10_{217}$	$-0{\cdot}10$
9th ,,	$0{\cdot}00_{221}$	$-0{\cdot}01$	$-0{\cdot}07_{221}$	$-0{\cdot}01$
10th ,,	$+0{\cdot}02_{217}$	$+0{\cdot}10$	$+0{\cdot}09_{217}$	$+0{\cdot}11$
11th ,,	$+0{\cdot}04_{198}$	$+0{\cdot}05$	$+0{\cdot}05_{185}$	$+0{\cdot}07$
12th ,,	$+0{\cdot}19_{270}$	$+0{\cdot}19$	$+0{\cdot}19_{276}$	$+0{\cdot}18$
13th ,,	$+0{\cdot}26_{234}$	$+0{\cdot}23$	$+0{\cdot}21_{215}$	$+0{\cdot}21$
14th ,,	$+0{\cdot}07_{276}$	$+0{\cdot}06$	$+0{\cdot}09_{211}$	$+0{\cdot}09$
15th ,,	...	...	$+0{\cdot}10_{216}$	$+0{\cdot}10$

Months.



2nd Supposition.

The 2nd supposition especially, and to some extent the 1st, shows something of a want of symmetry in the wave, which

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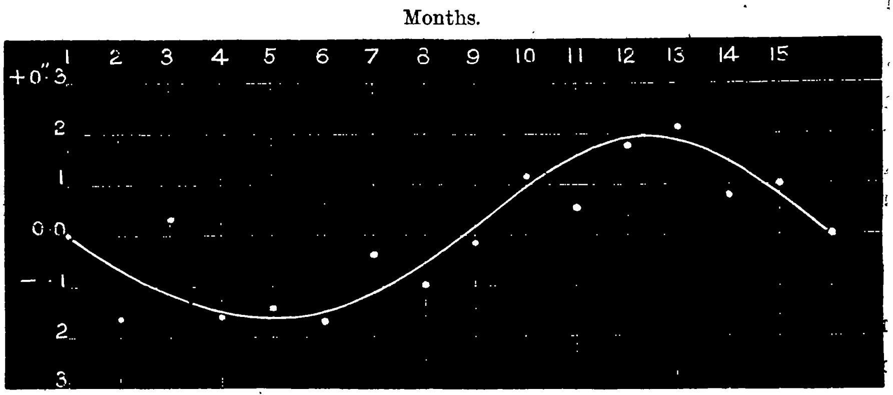
is more or less removed by the application of the correction for an assumed monthly difference in the R−D correction, and further evidence is needed to confirm this. The investigation will be continued, and the present paper must be regarded as preliminary merely; but the matter is of sufficient importance to make it advisable to publish these results at once.



2nd Supposition (corrected).

On the Systematic Errors of the Moon in Right Ascension.

By H. H. Turner, M.A., B.Sc.

In February 1892 Captain Grant, of the Ordnance Survey, consulted the Astronomer Royal concerning operations for fixing the boundary of Mashonaland, in concert with Portuguese officers, by parallels of latitude and longitude.

It was decided that he should determine the requisite longitudes by Moon-culminations, taking with him a portable transit by Troughton & Simms. Application has several times been made to the Astronomer Royal, in connection with similar operations, for a list of the Moon's errors on certain dates, as determined by the Greenwich Transit Circle, but in the present instance the actual landmarks were to be fixed on the spot, and hence retrospective corrections depending on information supplied from Greenwich were out of the question. It remained to be decided whether from recent observations any prospective corrections to the Moon's place could be tabulated and furnished to Captain Grant before his departure. For this purpose a complete list of observed errors of the Moon in R.A. for the years 1883–1891 was formed. The year 1883 was the first in which Newcomb's corrections to Hansen's tables were applied in the *Nautical Almanac*; and quite apart from any theoretical question as to the exact relation of these corrections to Hansen's tables, their adoption in the *Nautical Almanac* has had the advantage of bringing readily into prominence several features of the residuals previously masked by the large corrections which had been